

## CLAIMS

1. Image-encoding method implementing iterated function systems (IFS), said method comprising the following steps:

- the partitioning an image I to be encoded into a set of image regions, known as destination regions,
- the association, with each of said destination regions D, of a corresponding source region S and a collage function w such that w(S) is a good approximation of said destination region D,

said collage function being broken down into:

- a spatial collage function  $w_s$ , acting on the position and/or the geometry of said source region S in order to create a decimated source region  $\bar{S}$ ; and
- a mass collage function  $w_M$ , acting on the contents of said decimated source region  $\bar{S}$ .

characterized in that said mass collage function  $w_M$  is an oscillating function.

2. Image encoding method according to claim 1, characterized in that said mass collage function  $w_M$  is a harmonic function.

3. Image encoding method according to claim 1, characterized in that said mass collage function  $w_M$  is a cosine function.

4. Image encoding method according to claim 3, characterized in that a transformed source region  $S' = w(S)$  is advantageously be defined by:

$$S'_i = w(S_i) = \sum_{l \in [0; N_c[} \sum_{k \in [0; N_c[} c_{kl} \times \bar{S}_i \times \cos(\theta_l i_x) \times \cos(\theta_k i_y) + b$$

where:

i is the index of the ith pixel of S', having co-ordinates ( $i_x, i_y$ );

$\bar{S}_i$  is the image of  $S_i$  according to  $w_s$ ;

$\theta$  is a real vector of  $R^{N_c}$  such that  $\theta_j = 2\pi/2^j$ ;

$c_{kl}$  and b are coefficients characterizing the collage function.

5. Image encoding method according to claim 4, characterized in that said coefficients  $c_{kl}$  and b are determined by searching for the coefficients minimizing an error between source and destination, said error being written as follows:

$$E = \sum_{i \in [0; \text{card}(D)[} (S'_i - D_i)^2$$

with: Card(D) being the number of pixels of D.

6. Image encoding method according to claim 5, characterized in that it implement a matrix linear system whose solutions are determined by means of one of the methods belonging to the group comprising a:

- direct method;
- 5       - iterated method;
- gradient method.

7. Image encoding method according to claim 6, characterized in that it implements a direct Gauss pivot method or Cholesky pivot method.

Sub A' 8. Image encoding method according to any of the claims 1 to 6, characterized in that said mass collage function  $w_M$  is written in the form of a combination of oscillating functions whose number and/or frequency and/or amplitude can be parametrized.

9. Image-encoding device implementing iterated function systems (IFS) comprising:

- 15       - means for partitioning an image I to be encoded into a set of image regions, known as destination regions D,
- means for the association, with each of said destination regions D, of a corresponding source region S and a collage function w such that  $w(S)$  is a good approximation of said destination region D,

20       said collage function being broken down into:

- a spatial collage function  $w_s$ , acting on the position and/or the geometry of said source region S in order to create a decimated source region  $\bar{S}$ ; and
- 25       - a mass collage function  $w_M$ , acting on the contents of said decimated source region  $\bar{S}$ ,

characterized in that said mass collage function  $w_M$  is an oscillating function.

10 Collage method, implemented in a method for the encoding and/or decoding of digital data representing images, implementing iterated function systems (IFS), said method comprising the following steps:

- 30       - the partitioning of an image I to be encoded into a set of image regions, known as destination regions,
- the association, with each of said destination regions D, of a corresponding source region S and a collage function w such that  $w(S)$  is a good approximation of said destination region D,

35       said collage method implementing a collage function broken down into:

- a spatial collage function  $w_S$ , acting on the position and/or the geometry of said source region  $S$  in order to create a decimated source region  $\bar{S}$ ; and
- a mass collage function  $w_M$ , acting on the contents of said decimated source region  $\bar{S}$ ,

characterized in that said mass collage function  $w_M$  is an oscillating function.

11. Method of decoding images encoded by means of an encoding method implementing iterated function systems (IFS), said encoding method comprising the following steps:

- the partitioning an image  $I$  to be encoded into a set of image regions, known as destination regions,
- the association, with each of said destination regions  $D$ , of a corresponding source region  $S$  and a collage function  $w$  such that  $w(S)$  is a good approximation of said destination region  $D$ ,

said collage function being broken down into:

- a spatial collage function  $w_S$ , acting on the position and/or the geometry of said source region  $S$  in order to create a decimated source region  $\bar{S}$ ; and
- a mass collage function  $w_M$ , acting on the contents of said decimated source region  $\bar{S}$ .

characterized in that said mass collage function  $w_M$  is an oscillating function, and in that said images are reconstructed by carrying out at least one iteration of said collage function applied to said corresponding source region  $S$ .

12. Decoding method according to claim 11, characterized in that the mass collage function applied to said decimated source region during the decoding takes account of a number of oscillating functions smaller than or equal to the number taken into account during the encoding.

13. Data carrier containing images encoded according to an image-encoding method implementing iterated function systems (IFS), said encoding method comprising the following steps:

- the partitioning an image  $I$  to be encoded into a set of image regions, known as destination regions,
- the association, with each of said destination regions  $D$ , of a corresponding source region  $S$  and a collage function  $w$  such that  $w(S)$  is a good approximation of said destination region  $D$ ,

said collage function being broken down into:

- a spatial collage function  $w_S$ , acting on the position and/or the geometry of said source region  $S$  in order to create a decimated source region  $\bar{S}$ ; and
- 5        - a mass collage function  $w_M$ , acting on the contents of said decimated source region  $\bar{S}$ .

only the position and/or the geometry of said source regions  $S$  and said collage functions being stored on said data support;

characterized in that said mass collage function  $w_M$  is an oscillating function,

10 ~~Sub A2~~ 14. Application of the method according to any of the claims 1 to 8 to at least one of the fields belonging to the group comprising the following fields:

- compression of fixed images;
- compression (of images) in "intra" mode in a video encoder;
- compression of images or of a part of the images that are textured;
- 15        - magnification (zooming) of image zones;
- compression in spaces having a size greater than 2.

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